

## CLAIMS

What is claimed is:

1. A multi-band infrared imaging device, comprising:  
2 An uncooled microbolometer focal plane array comprising a  
3 plurality of pixels, each of said pixels further comprising at least  
4 one structure layer, a detector layer and a medium wave absorber  
5 layer, and wherein each said pixel simultaneously detects at least  
6 two IR bands.
- 7
1. 2. The device according to claim 1, wherein said array is fabricated  
2 by LWIR processing.
- 3
1. 3. The device according to claim 1, wherein said bands are selected  
2 from the group consisting of: MWIR/LWIR, MWIR/SWIR,  
3 SWIR/LWIR, SWIR/MWIR, and SWIR/MWIR/LWIR.
- 4
1. 4. The device according to claim 1, wherein said structure layer is  
2 selected from at least one of the group consisting of: metal films,  
3 semiconductor films, and dielectrics.
- 4
1. 5. The device according to claim 1, wherein said medium wave  
2 absorber layer is selected from at least one of the group  
3 consisting of: metal films, semiconductor films, and dielectrics  
4 with high MW absorption.
- 5
1. 6. An optical stack for an uncooled microbolometer device, comprising:  
2 a read out integrated circuit (ROIC) substrate;  
3 a reflector on a surface of said substrate;

4           a plurality of layers fabricated by LWIR processing, wherein  
5           said plurality of layers include an MWIR absorber, a detector,  
6           and at least one structure layer providing support and/or  
7           isolation;  
8           a gap between said reflector and said plurality of layers; and  
9           wherein said stack is part of said uncooled microbolometer and  
10          detects at least medium wave radiation.

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1       7. The stack according to claim 6, wherein said structure layer is  
2       selected from at least one of the group consisting of: metal films,  
3       semiconductor films, and dielectrics.

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5       8. The stack according to claim 6, wherein said stack further detects  
6       LWIR and/or SWIR.

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1       9. The stack according to claim 6, wherein said structure layer  
2       comprises at least one silicon nitride layer and at least one silicon  
3       dioxide layer.

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1       10. The stack according to claim 6, wherein said detector is vanadium  
2       oxide (VO<sub>x</sub>) or amorphous silicon.

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1       11. The stack according to claim 6, wherein said MWIR absorber is  
2       selected from at least one member of the group consisting of:  
3       metal films, semiconductor films, and dielectrics with high MW  
4       absorption.

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1       12. The stack according to claim 11, wherein said MWIR absorber is  
2       chrome, titanium nitride (TiN) or titanium tungsten (TiW).

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1       13. A multi-spectral infrared (IR) focal plane array, comprising:

2                   an uncooled microbolometer detecting at least two infrared  
3                   bands, said microbolometer comprising;  
4                   a generally planar read out integrated circuit substrate base;  
5                   at least one generally planar microbridge disposed  
6                   approximately parallel to said base and separated by a gap; and  
7                   wherein each said microbridge comprises a plurality of layers,  
8                   said layers comprising at least one structural support layer, a  
9                   detector layer, and selectively a medium wave absorber layer.

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1                  14. The array according to claim 13, wherein said array is selectively  
2                   programmable to at least one of said bands.

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1                  15. The array according to claim 13, wherein said array is processed  
2                   by LWIR techniques.

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1                  16. The array according to claim 13, wherein said at least one  
2                   microbridge forms a two-dimensional array having at least one  
3                   microbridge without said medium wave absorber layer.

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1                  17. The array according to claim 13, wherein said multiple IR bands  
2                   are selected from the group consisting of: SWIR/MWIR,  
3                   SWIR/LWIR, MWIR/LWIR, and SWIR/MWIR/LWIR.

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1                  18. The device according to claim 13, wherein each said microbridge  
2                   of said array is arranged in a pattern having at least one said  
3                   microbridge with said medium wave absorber and least one said  
4                   microbridge without said medium wave absorber.

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1                  19. The array according to claim 13, wherein said medium wave  
2                   absorber is selectively formed by a pattern etch.

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1        20. The array according to claim 13, wherein at least one microbridge  
2                  of the array is optimized for one of said bands and at least one  
3                  microbridge of the array is optimized for a different one of said  
4                  bands.